THE INHERITANCE OF THE NAVAL OFFICER.[1]

IT seems good sense to say that a man who dislikes the sea and all that therein is, who has no spirit of adventure, who is, in short, a low-spirited land-lubber, is not in the least likely to make a distinguished naval officer. You never can tell, of course, for Nelson was always sea-sick and often pessimistic, but the chances are against a man such as we have pictured becoming a bright and shining light in the Navy. And that is what Dr. Davenport and his assistant have said, only they have said it very learnedly with a lot of technicalities about "thalassophilia," "hyperkinetism," "nomadism," and "recessives." The study of heredity does not foster a sense of humour, and we cannot wonder. It is a rather dismal science.

But the memoir before us goes much further than we have indicated. It is argued from sixty-eight biographies that distinguished naval officers have clear-cut special gifts, which are more or less Mendelian characters. They are expressed in the lineage, direct or collateral, and likewise find appropriate expression in early youth. If the number sixty-eight affords a sufficiently broad basis for secure induction, and if such characters as a love for the sea are really crisply defined, non-blending, unit characters, then the conclusions reached are of high interest. Both for theory and for action it is very important to know how much a man is made and how much he is born, and this latest product of the industry and enthusiasm of the Cold Spring Harbour laboratory for the experimental study of evolution and heredity is a contribution to the answer to this question. We should notice that, apart from the non-inclusion of those distinguished officers whose biographies failed to furnish any details of lineage or of boyhood, no selection of names was made. Dr. Davenport set out without any theory save the preconception which previous studies have warranted, that the hereditary make-up of a distinguished man is likely to include definite traits, being not so much a melange as a mosaic.

What, then, are the features which may be regarded as part of the natural inheritance of a distinguished naval officer, as contrasted with, let us say, a distinguished clergyman? The first is a love for the sea, a specific susceptibility to its call, a "thalassophilia." Unless this, or some analogous characteristic, such as nomadism, is in the blood, the chances are against the boy becoming a distinguished naval officer. Such is the verdict of biography. The second feature is some form of the spirit of adventure, a willingness to incur responsibilities, a capacity for rapid decision and action in face of difficulties. A few cases of persistent sea-sickness in admirals may be found—Nelson's is known to all but there seems to be no instance of a distinguished naval officer without some form of the spirit of adventure. Very rarely has it taken the form of quarrelsomeness, or of pugnacity, or of devil-may-care rashness—though instances of these are well known—but a distinguished naval officer without the quality at all is a contradiction in terms. The third character that is normally present is the sanguine or buoyant temperament, which is technically described as hyperkinetic in contrast to the melancholic and fatalistic hypokinetic. Now, it is an interesting fact that a small minority among the sixty-eight were of the hypokinetic type—reserved, taciturn, melancholic, fatalistic—and that two or three of the greatest were strange mixtures of both, like Nelson, passing from the crests to the troughs of temperamental waves, probably enough correlated with changes in blood-pressure that would kill an ordinary man. But the great majority of the famous sea-captains have been markedly hyperkinetic, not only daring pilots when the waves ran high, but also positively defiant in danger.

As it seems to us, Dr. Davenport is too readily satisfied with the evidence that this or that character exhibits Mendelian inheritance, and that he attaches far too little importance to the family tradition and conversation in defining the lines of a boy's development; but he states a strong case in support of the view, which is more convincing in negative than in positive form, that "unless a love of the sea appears on at least one side of the house, hyperkinesis in at least one parent, or, in the case of an eminent naval man, among the male relatives of the mother, one is justified in doubting if the applicant for a naval commission will become an eminent officer." It is easy enough to make fun of this contribution to "the pedigree of the sea-dogs," but the number of round men in square holes is one of the tragedies of the world, and we wonder gravely how long it will be before wasteful methods of selection are replaced by those suggested by expert study of lineage and of childhood. As Mahan once said —and he had a great knowledge of naval officers —"Each man has his special gift, and to succeed must act in accordance with it." Dr. Davenport's memoir is a contribution to the art of discovering special gifts, or of estimating the probability of their presence.

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[1] "Naval Officers: Their Heredity and Development." By Charles Benedict Davenport and Mary Theresa Scudder. Publication No. 259 Pp. iv+2[illegible]6. (Carnegie Institution of Washington, 1919.)

NOTES.

THE newspapers have lately published a big-game hunter's report that a gigantic dinosaurian reptile related to the extinct Brontosaurus and Diplodocus has been seen living in the Congo region of Africa. Palæontologists, however, receive the story with incredulity, and are decidedly of opinion that it must be founded on mistaken observations. The Dinosauria and all their gigantic reptilian contemporaries, whether on land, in the sea, or in the air, disappeared from every part of the world at the end of the Cretaceous period. If any had survived, some fragments of them would ere this have been found in the Tertiary formations which record the progress of life between that period and the present day. It is no contrary argument to quote Sir Harry Johnston's discovery of the okapi in the Congo forest, for this is merely a kind of ancestral giraffe which is known by fossils to have existed so far north as Greece so recently as the beginning of the Pliocene Tertiary. The okapi is a congruous African animal, but a dinosaur would be an anachronism.

IN his Trueman Wood lecture delivered before the Royal Society of Arts on December 10, Sir Oliver Lodge dealt with "Sources of Power Known and Unknown." Power or energy, he said, is the most pressing material need of man. His entire material activity consists in moving matter, and food is mainly used by an animal for developing energy before it has assumed the form of heat. The best engines hitherto devised leave much to be desired in that respect. Even the internal-combustion engine is imperfect so long as it requires a cooling jacket. By the second law of thermodynamics, heat is most efficiently utilised at the highest temperatures. The sun's temperature being 6000° C. approximately, its direct utilisation would offer an efficiency closely approaching unity. The leaves of trees, and vegetables generally, are able to absorb and utilise solar energy in producing wood, coal, and food, and they seem to be able to do this without much regard to any hampering law of efficiency. There are two sources of energy not derived from the sun—the internal heat of the earth and the tides. A beginning has been made in utilising volcanic heat in Italy, but the utilisation of tides involves a use of reclaimed land which might be more valuable for other purposes. Dealing finally with atomic energy, Sir Oliver Lodge gave an admirably lucid account of the "planetary" atom on the basis of Bohr's model, showing that electrons can be "evaporated" or ejected with comparative ease, whereas the projection of an α-particle amounts to a veritable explosion. So far, the vast store of atomic energy becomes available only in radio-active substances, and this is already utilised for therapeutic and other purposes. There is, however, the control of electrons emitted from hot bodies, which has been brilliantly applied to the construction of "valves" for many electric purposes, among them being long-distance wireless telephony.

THE successful termination of Capt. Ross-Smith's flight from Hounslow to Port Darwin marks a great advance in the history of aeronautics, and is a good omen for the future of commercial aviation. This remarkable accomplishment leaves no doubt as to the possibilities of the aeroplane with regard to rapid transit to distant parts of the earth, especially when it is noted that the weather conditions were by no means good over the greater portion of the route. The machine used was a Vickers "Vimy," fitted with two Rolls-Royce "Eagle" engines of 350 horse-power each, and the greatest credit is due to the two firms for the remarkable endurance of their products under very trying conditions of both flying and landing. The difficulties attending such a flight are very different from those of the trans-Atlantic journey. In the latter case an endurance of 2000 miles without landing was essential, involving the carrying of an enormous load of fuel. The cross-country route to Australia, on the other hand, provided many possible landing places, but endurance of a different kind was necessary, inasmuch as the machine had to fly day after day with little time for attention and repairs, if the flight was to be completed within the specified time limit. Capt. Ross-Smith left Hounslow on November 12 and reached Port Darwin on December 10, having traversed a distance of 11,294 miles, steady progress being maintained throughout the flight. The feat will rank as one of the greatest in the development of the aeroplane, and the heartiest congratulations are due to the pilot and his companions for their remarkable addition to the list of aeronautical triumphs.

ON Monday, December 15, one of the galleries of the new building for the Science Museum, South Kensington, was opened for the exhibition of the existing aeronautics section of the collections and for the development of that section by additions which are being selected under the guidance of a number of expert advisers. The occasion was marked by the formal presentation of the Vickers "Vimy" Rolls-Royce aeroplane which crossed the Atlantic. In the absence of the President of the Board of Education, Dr. Ogilvie, Director of the museum, took the chair and referred briefly to the building scheme which had been put in hand for the museum in 1913, but was interrupted by the war. The gallery now occupied was, he said, in the temporary state in which it had been used for war purposes; it was, however, spacious and well-lit, and its use by the museum for a time now would give an opportunity of preparing a more adequate representation of the applications of science in aeronautics. Sir Richard Glazebrook, a member of the Advisory Council for the museum, reviewed recent progress in aviation, and stated that if this country was to hold the place it had taken in the forefront of aeronautics a complete exposition of the subject must be made available for reference in a central museum, such as the Science Museum. It was a matter for great gratification that the Government was giving serious attention to the promotion of research, and one of the functions of the museum was to aid in this by bringing together examples of the ways in which science gave help to industry and commerce. In presenting the aeroplane to the nation, Mr. Douglas Vickers, for Messrs. Vickers, Ltd., explained that it was one of the Vickers "Vimy" machines—bombing machines to carry a crew of three and a ton of bombs for 1000 miles on a non-stop flight. That standard machine had been varied only so as to take, instead, a crew of two with fuel for a journey of 2500 miles.

MR. W. WALKER has been appointed Chief Inspector of Mines in succession to Sir Richard Redmayne, whose impending resignation we announced last week.

MR. T. W. READER has been selected by the Geologists' Association as the first recipient of the Foulerton award. The sum of money which has enabled the association to make this award is the recent generous gift of Miss Foulerton in accordance with the wishes of her late uncle, Dr. John Foulerton, who was for many years secretary to the association.

PROF. H. G. GREENISH, Dean of the Pharmaceutical Society's School of Pharmacy, has, we learn from the *Pharmaceutical Journal*, been nominated by the Board of Professors of l'Ecole Supérieure de Pharmacie de Paris as one of five foreign men of science upon whom the University of Paris has decided to confer the diploma of "Docteur *honoris causa*" on the occasion of "Une Séance Solennelle de rentrée pour fêter le retour des étudiants des diverses Facultés," on Saturday, December 20.

ON Wednesday, December 10, a memorial tablet with a medallion portrait and a suitable inscription was unveiled in memory of Sir William Ramsay in the presence of Lady Ramsay and a large number of friends and members of the University of Glasgow. The address of presentation was delivered by Prof. G. G. Henderson, of the Regius chair of chemistry, and the custody of the memorial was accepted on behalf of the University Court by the Vice-Chancellor. The medallion is the work of Mr. Paulin, and is an excellent likeness; the design of the memorial is due to Sir John J. Burnet. The mural tablet is placed at the head of the great staircase leading to the Bute Hall and the Hunterian Museum. It is set in an arched recess lined with grey marble, and bears reliefs illustrating Sir William Ramsay's numerous decorations and honours.

AN influential committee, with Sir F. G. Kenyon as its chairman, has issued an appeal for the foundation of a school of archæology at Jerusalem to conduct exploration in Palestine, Syria, and Mesopotamia. The school will facilitate the work of scholars, train students, excavators, and administrators, and assist in every way the Palestine Exploration Fund. Its researches will extend from the Stone age and the early cultures down to the later Mohammedan period. The school will catalogue existing remains and cooperate with the archæological departments which, it is hoped, the new Governments will establish. It will hold itself aloof from politics and religious controversies. A site has been secured for the necessary buildings at Jerusalem, and Prof. J. Garstang, of the University of Liverpool, who has already visited Palestine, has been provisionally appointed the first director. The scheme is in every way commendable, and the necessary funds will doubtless be provided without difficulty. Communications should be addressed to the Secretary, British School, c/o Palestine Exploration Fund, 2 Hinde Street, Manchester Square, W.1.

A DOZEN years ago the expressions "newer physics" and "newer chemistry" would have been taken to refer to those branches of the subjects which centred round the words "electron" and "radium" as opposed to those dealing with surface tension, sound, etc., or with atomic weights and constitutional formulæ to which the term "older" might have been applied. It is interesting to note how the last few years have rendered the two terms inappropriate, and how fields which were considered worked out, or at least not likely to produce returns which would justify the time spent on further research, have proved themselves not merely fertile, but also worthy of cultivation for many years to come. A revision of astronomy and physics in the light of the theory of relativity has to be carried out; the hydrophone has brought new problems in elasticity to light; we want more knowledge of atomic weights, of the action of catalysts, and of the synthesis of nitrates. On surface tension and contact angles a whole industry has been founded, some of the problems of which are dealt with by Mr. H. L. Sulman in a paper read before the Institution of Mining and Metallurgy on "Flotation," a summary of which appears elsewhere in this issue.

THE foundation of the Salters' Institute of Industrial Chemistry about a year ago was celebrated on December 11 by a dinner given by the Salters' Company to a number of leading representatives of applied chemistry, the Master, Mr. W. B. M. Bird, presiding. Salters or drysalters have for centuries been the recognised dealers in potashes, dyestuffs, and almost every chemical preparation; and their livery of the City of London has taken a prominent part in the promotion of technical education and of research in chemistry. The Company does this because, as Mr. Bird remarked at the dinner, it believes in the progress of chemical industry through scientific knowledge, and considers it a privilege as well as a duty to assist in such development. The institute established last year is not a building or a laboratory, but a foundation for the award of fellowships to enable post-graduate students to continue their studies, or suitably equipped chemists to carry on research in chemical industry. Grants are also made to artisans attending evening classes for the purchase of books and like assistance in their studies. The director of the institute is Dr. M. O. Forster, and under his capable and sympathetic guidance, with the liberal support of the Salters' Company, the fellowships, which are of the value of 250*l.* a year, promise to exert the same effective influence upon chemical science that the 1851 Exhibitions have upon scientific research generally. The scheme was wisely conceived, and its formation gives worthy cause of congratulation to all who are concerned with it.

THE appointment of Mr. G. H. Hardy, fellow and mathematical lecturer of Trinity College, Cambridge, to the Savilian professorship of geometry at Oxford reminds us that the present year marks the tercentenary of the foundation by Sir Henry Savile of the first university chairs of geometry and astronomy in Great Britain. Gresham in 1596 had inaugurated similar professorships in London, but the Gresham College never attained the importance it might have done, and London had to wait two centuries for her university. Both the famous Elizabethans, Gresham and Savile, performed valuable services for their Queen and country, and both were favourites at Court. Savile, who was born near Halifax, Yorkshire, in 1549, was, from 1585 until his death in 1622, Warden of Merton College, Oxford, of which he had been made a fellow in 1570. He founded the Savilian professorships in 1619, and the first holders of them were Briggs and Bainbridge, the former of whom had been the first Gresham professor of geometry. Briggs, who, like Savile, was born near Halifax, is best known for his notable works on logarithms and his intimacy with Napier, and the details of his life are generally familiar. Bainbridge did not rise to the same celebrity as his colleague, which may be partly accounted for by the fact that he was trained as a physician, and while Savilian professor of astronomy he was also Linacre reader in medicine. He was born in Leicestershire in 1582, and died in 1643, twelve years after Briggs. Savile, besides being Warden of Merton, was from 1596 Provost of Eton, where he died and is buried. He is commemorated by a monument in the choir of Merton College, close beneath which are the tombs of Briggs and Bainbridge, the former of whom died in the college, and the latter in a house just opposite.

MR. C. T. WHITMELL, the well-known amateur astronomer, who died at Leeds on December 10 after a brief illness, graduated at Cambridge in 1872, being placed in the First Class in the Natural Sciences Tripos and Senior Optime in the Mathematical Tripos. He was a prominent member of the British Astronomical Association, and contributed very largely to its journal. His interests lay in the mathematical rather than in the observational side of astronomy, though his long series of observations of the phenomenon known as the "green flash" are almost unique. Mr. Whitmell acted as director of the expedition to Spain organised by the British Astronomical Association for the purpose of viewing the solar eclipse in May, 1900. He was a fellow of the Royal Astronomical Society and published several papers in the Monthly Notices. His careful determination of the maximum duration of totality of a solar eclipse supersedes De Sejour's erroneous value. On his appointment as H.M. Inspector of Schools in Leeds in 1897 he identified himself with many of the scientific societies in that city. The Leeds Astronomical Society, which owes much to his interest and devotion, elected him as president in 1898–99. In his earlier years Mr. Whitmell did a fair amount of geological fieldwork, both in England and abroad. He was an active member of the Leeds Geological Association, of which he was at one time president.

A NOTABLE figure in the engineering world passed away on December 14 in the person of Sir John Jackson. Born in 1851, Sir John was destined to become one of the most potent agencies of his day in directing the forces of Nature and adapting them to the service of man. As a contractor for large public works, he was responsible for the carrying out of gigantic engineering schemes, which have appreciably altered the topography of many lands, and remain a permanent record for the admiration of future generations. His most notable achievements include the great railway across the Andes from Arica to La Paz, the Hindiat barrage across the Euphrates near Babylon, harbours at Singapore and Simon's Bay, the Keyham docks at Devonport, irrigation works in Mesopotamia, the foundations of the Tower Bridge, London, and the last section of the Manchester Ship Canal. Sir John took a prominent part in political life, being M.P. for Devonport from 1910 to 1918. He was a member of the Royal Commission appointed to inquire into the South African War. Another Royal Commission recently exonerated his firm from the charge brought by the Public Accounts Committee that it had unfairly secured contracts which were not thrown open to competition. Sir John was knighted in 1895, and created a C.V.O. in 1911. Educated at York and Edinburgh University, the degree of LL.D. was conferred upon him by the latter. He was also a fellow of the Royal Society of Edinburgh.

A CONFERENCE of research associations—the second of a series—organised by the Department of Scientific and Industrial Research, was held on December 12 in the lecture-theatre of the Institution of Civil Engineers. The Right Hon. A. J. Balfour, Lord President of the Council, appropriately presided, the Department of Scientific and Industrial Research being a Committee of the Privy Council. Mr. Balfour, who was warmly greeted on his first public appearance in his capacity of head of the Department, delivered a short introductory address on the national need for scientific research, especially in its application to industry. Three points emphasised by Mr. Balfour were that, though man does not live by bread alone, the amelioration of the material lot of mankind can come only through progress in scientific knowledge; that we must not imitate, but follow the example of the Germans in realising a helpful and close alliance between science and industry; and that, in the prosecution of this aim, the paramount interests of pure science must not be overlooked. Papers were afterwards read by Major H. J. W. Bliss, director of the British Research Association for the Woollen and Worsted Industries, on "Research Associations and Consulting Work and the Collection and Indexing of Information," and by Dr. W. Lawrence Balls on "The Equipment of Research Laboratories." There was a general discussion on the subject-matter of the two papers, from which it was clear that, although there is a large common measure of agreement among the different associations, there is also enough variety of circumstance and character to make it desirable for each association to work out its own salvation in many problems of organisation and method. It is the intention of the Department of Scientific and Industrial Research to continue periodically these conferences of research associations. As the Department, in fostering the associations, is engaged in a novel adventure in Government enterprise, the research associations have to set sail on uncharted seas, without maps or precedent experience to guide them, and these periodical conferences must be of great help to them in mapping out their courses and taking their soundings.

THE important question of the future of wheat production, with special reference to the Empire, is dealt with at length in the current number of the Bulletin of the Imperial Institute. The annual production of wheat in the world prior to the war amounted to about 110,000,000 tons, the largest producers being the Russian Empire, with an output of 22,000,000 tons, and the United States, which provided nearly 19,000,000 tons. During the war the production in Europe as a whole, and in Russia in particular, decreased considerably, but outside Europe there was a great expansion. The acreage under wheat in Canada, the United States, Argentina, India, and Australia in 1918 was more than 25 per cent. larger than the average acreage for the five years before the war, and it is considered that at the present time there is a sufficiency of wheat, even without the help of Russia, to meet the requirements of the world. As regards the future also there is reason for optimism. There are vast areas of land suitable for wheat-growing yet to be opened up in Canada, Australia, South America, Siberia, and other countries, whilst the present low average yield of thirteen bushels per acre is susceptible of great improvement. In recent years the increase in the world's production has been due to a great extent to an increased yield per acre, and there is every reason to believe that with the introduction of improved drought- and rust-resistant varieties the rise will be even more rapid in the future.

IN the current number of *Parasitology* (vol. xi., Nos. 3 and 4) Dr. D. Keilin describes the larval structure and the complete life-history of a species of fly, *Melinda cognata*, Meig., the larvæ of which live as parasites in the snail, *Helicella virgata*, and he gives a short account of various other dipterous larvæ that have been found in living or dead snails and other molluscs. But the most generally interesting part of his paper is, perhaps, the additional note relating to snails and house-fly larvæ, to which Dr. C. J. Gahan has directed attention in a letter to the *Times*. For if the observations made by M. E. Séguy, which are now for the first time made known, turn out to be correct, as they probably will, a solution of the mystery surrounding the hibernation of the house-fly cannot be far distant. That from nine out of fifty snails collected in midwinter larvæ of *Musca domestica* were obtained may be an unexpected, but is not at all an incredible, statement. If true, the fact would at once go far to explain why the search in winter for larvæ or living pupæ of house-flies in or near the places in which they are usually to be found in summer has hitherto always met with failure; for no evidence has ever been obtained to show that house-flies go through the winter in the adult stage, and they must go through it somehow. The larvæ of some flies are known to live only in one species of mollusc, but there is no reason to think that this will be found true of the house-fly. Those who may search for its larvæ this winter would do well not to confine their attention to one or two common species of snail only; and should they look out also for its pupæ they may find them, not inside the body of the snail, as has been absurdly suggested, but in the earth near by, or in the sheltered hole in the wall where the snail itself is found.

A HIGHLY interesting paper on "The Direct Replacement of Glycerol in Fats by Higher Polyhydric Alcohols" is contributed to the *Biochemical Journal* for November by Prof. A. Lapworth and Mr. L. K. Pearson. The work described is the outcome of an endeavour to convert the large quantities of fatty acids produced during the war in the manufacture of glycerol into an edible foodstuff. These authors found that when olein or stearin is distilled under reduced pressure with mannitol in the presence of a little sodium ethoxide, almost the whole of the glycerol present in the original fatty compound is expelled, the greatest yield being attained when the proportion of fat to mannitol corresponds with two molecules of the former to three of the latter. The other products of the reaction are chiefly water, a little alcohol, and a substance many properties of which are similar to those of the original fat. The composition of this latter substance corresponds with that of a mixture of the di-oleates (or distearates) of mannitan and isomannide.

THE first number of the *N.P.L. Review*, edited by members of the staff of the National Physical Laboratory, Teddington, appeared in November. Its thirty-six pages contain a large amount of information on the scientific and other activities of the staff, much of which will prove of interest to the general public as well as to those for whom it is primarily intended. Now that the laboratory is a Government institution, it seems reasonable that its work should be more widely known than it has been in the past, and readers of the review will find in it a clear statement of the way in which the laboratory has been fitted into the organisation of the Scientific and Industrial Research Department. From the articles on the old and new directors it appears that the process of fitting has necessitated a decrease in the responsibility of the office, and under Treasury regulations there seem now to be difficulties in the way of rewarding merit by increase of salary. Seven or eight pages are devoted to notes on the most important work passing through the various departments. All are interesting, and show clearly how the scientific problems of the industries are being solved. The staff of the laboratory is to be congratulated on its new publication.

THE power required for actuating the plant and machinery of the Panama Canal is obtained by utilising the flow of surplus water over the Gatun Dam, the height of which above sea-level enables an average effective head of 75 ft. to be realised throughout the year. The power plant at first installed comprised three turbines, each of a rated capacity of 2250 kilowatts when running at 250 revs. per minute and supplied with 500 cu. ft. of water per second. A flow of 500 cusecs, with a fall of 75 ft., produces nominally 3160 kilowatts, so that there is an efficiency margin of 37 per cent. The demand has been found to be much under-estimated, and it has become necessary not only to provide three additional machines of greater capacity, but also to increase the output of the existing generators. Of the three additional machines only one is yet in position, but when the installation is complete there will be three units of 2880 kw. each and three units of 4500 kw. each, totalling 22,140 kw., and requiring a supply of just over 4000 cu. ft. of water per second. The electric energy is employed to drive the machinery of the locks at Gatun, Miraflores, and Pedro Miguel, of the haulage locomotives, of the permanent machine-shops, of the dry dock, and of the coal-handling plant, besides lighting the locks and many towns comprised within the canal zone—a stretch of country ten miles in width across the isthmus. We are indebted for the foregoing particulars to an article in the *Engineer* of December 5.

MR. E. A. MARTIN, the author of "Dew-Ponds," is bringing out through *Messrs. Allen and Donaldson, Ltd.*, 57 Marsham Street, S.W.1, a book entitled "Life in a Sussex Windmill," recounting his experiences of three years in a somewhat unusual dwelling, and giving particulars of his observations of Nature on the Sussex Downs. The portions of the book which will be of special interest to readers of NATURE are the chapters devoted to the geology of the Downs, the problem of the dry combes, prehistoric man and marling, water-supply, fossil oysters, Sussex iron and wood, and the possible discovery of coal in the county.

THE *Cambridge University Press* has in preparation "The Cambridge Ancient History," the general plan of which will be similar to that of the Cambridge Modern and Medieval Histories. It will be in eight volumes, and, beginning with an account of archæological discovery, will trace the history of Egypt and Babylonia, Assyria and Persia, Greece and Rome, to 324 A.D. The work will be edited by Prof. J. B. Bury and Messrs. S. A. Cook and F. E. Adcock.

OUR ASTRONOMICAL COLUMN.

THE DECEMBER METEORIC SHOWER.—Mr. Denning writes that this display was well observed at Bristol on the night following December 13. The early evening was overcast, but after a storm of rain at 10 p.m. the sky cleared, and between 10h. 30m. and midnight meteors were observed to be falling at the rate of thirty-five per hour. The moon rose just before 12h., and during the next hour, when her light and films of thin cloud obscured some of the smaller meteors, the horary rate decreased to seventeen. There were two radiants, viz. at $114^\circ+33\frac{1}{2}^\circ$ (eighteen meteors) and at $107^\circ+24^\circ$ (twelve meteors), but the marked differences in aspect of the members of the two streams were very pronounced. The first-named radiant represented the true Geminids, and they are of moderate speed, with short paths sometimes stellar in aspect, and of a sparkling silvery-white colour.

A brilliant Geminid was seen at 11h. 40m. falling from $131^\circ+10^\circ$ to $138^\circ+0^\circ$, and giving a succession of flashes. It lit up the foggy, humid atmosphere, and was much brighter than Jupiter, slightly to the east of it. This meteor must have been a splendid object as seen from the Eastern Counties of England, and it is hoped that further observations will come to hand. A very conspicuous lunar halo was visible during the early morning hours of December 14.

DISCUSSION ON RELATIVITY.—The meeting of the Royal Astronomical Society on December 12 was entirely devoted to the consideration of the theory of relativity. The discussion was opened by Prof. Eddington, who said that while on the first relativity theory time was adopted as the fourth co-ordinate merely as a convenient system, in Einstein's theory the time-space continuum was inextricably blended, so that what was pure time to one observer was resolved into partly time, partly space for another, differently circumstanced. The distinction between past and future was, however, for sentient beings somewhat greater than that between right and left. If space were re-entrant and finite, the section of the continuum in the time direction would be hyperbolic, so that time would not repeat itself after an enormous interval.

Dr. Jeans said that physicists had other than astronomical grounds for asserting that the foundation-stone of the new system was "well and truly laid." It was originally built on experiments, and since its enunciation further experiments had confirmed its truth. He gave the expressions for a wave-front of light, stating that an observer initially at its source remained central in spite of his own movement.

Sir Oliver Lodge referred to some of the apparent paradoxes that had been uttered, and said he preferred to take the æther, not the observer, as his base of reference, instancing the confused idea of the landscape that one obtained when travelling by train.

Dr. Silberstein pointed out that the star displace-